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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/605,858

Filing Date: October 31, 2003

Appellant(s): PARK ET AL.

Domenica N.S. Hartman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 29, 2006 appealing from the Office action mailed February 2, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,900,613

GALMICHE et al.

8-1975

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 9, 11-12, 21-25, 28, 30-31, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Galmiche et al. (US 3,900,613).

Galmiche et al. discloses a process of forming a diffusion coating on a component comprising the steps of: dissolving ammonium chloride activator in a solvent to form an activator solution; mixing a particulate donor material containing a coating element with the activator solution to form an adhesive mixture having a cement-like, formable and malleable consistency, wherein the adhesive mixture does not contain an extraneous binder and the donor material and filler are cohered solely by the dissolved activator; applying the adhesive mixture to a surface of the component; and heating the component to a temperature sufficient to vaporize and react the activator with the coating element of the donor material to form a reactive vapor of the coating element, the reactive vapor reacting at the surface of the component to form a diffusion coating containing the coating element (col. 2-3). Example I comprises a step of dissolving ammonium chloride activator in solvent. While the mixture of Galmiche et al. additionally includes a surface active agent such as oleic acid (an oily liquid), it is noted that

such a surface active agent would not cohere the filler and donor materials. To the contrary, Galmiche et al. teaches that the surface active agent is responsible for conferring thixotropic properties on the mixture. Surface active agents reduce surface tension between a liquid and a solid and allow easier spreading of a liquid; this property is what provides the thixotropic properties. Therefore, it is the Examiner's position that the surface active agent has a property *opposite* of acting as an adhesive or binder -- a property of reducing surface tension and causing spreading, and thus the dissolved activator must solely cohere the filler and donor materials.

As to claims 2 and 22, Galmiche et al. teaches a step of drying the solvent in col. 4, lines 19-23.

As to claims 3-4 and 23-24, Galmiche et al. teaches that the coating element is aluminum, and the donor material may be an alloy of aluminum such as CrAl (col. 3, lines 10-13, and Example II).

As to claims 9 and 28, Galmiche et al. teaches that the substrate component may be a gas turbine engine component formed of superalloy (Examples III and IV).

As to claim 12, it is the Examiner's position that since the coating mixture in the process of Galmiche et al. is cementitious in its texture, and is applied by vibrating the substrate, a completely uniform thickness of the mixture will not be achieved.

As to claims 11 and 30, it is noted that the substrates used in the Examples are make-new components, and the treated surfaces constitute limited surface portions of the components.

As to claims 31 and 33, it is noted that the mixture of Galmiche is selectively applied and adhered to the orifice in which chromaluminization is desired, not to the remainder of the ramp

in Example I. The heating step in Galmiche causes the diffusion coating to form only on the surface to which it was selectively applied.

Claims 6-7, 10, 13-20, 26, 29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galmiche et al.

As to claims 6, 13-15, and 26, Galmiche et al. lacks a teaching of using water as the solvent. Galmiche et al. teaches using solvents that are absolute alcohols whose boiling point is preferably located between 80 C and 120 C (col. 3, lines 36-42). It is noted that water is chemically similar to alcohols and has a boiling point of 100 C, within the specified boiling point range. It would have been obvious to have used water as the solvent in the process of Galmiche et al. with the expectation of similar and successful results since water is inexpensive, readily available, and is similar to alcohols and has a boiling point in the specified range. Additionally, Galmiche's list of surface active agents, which is dissolved in the solvent, is merely exemplary and not limiting.

As to claim 7, Galmiche et al. teaches that the filler has a high heat of formation soluble in certain acids, with magnesia as the preferred filler material (col. 3, lines 14-22). It is noted that alumina is a known filler material that performs in a manner similar to magnesia. It is the Examiner's position that it would have been obvious to have used alumina filler, or other similar fillers, in place of magnesia filler with the expectation of similar results since the two materials are often equivalent and interchangeable filler materials.

As to claims 10 and 29, Galmiche et al. lacks a teaching that the surface of the component substrate is a repaired surface region. The Examiner notes that it is well known in the gas turbine engine art to repair coatings on gas turbine engine components because the

components are expensive and it is more economical to repair them than to repeatedly produce new components. It would have been obvious for one having ordinary skill in the art to have performed the process of Galmiche et al. on a repaired surface region with the expectation of similar results.

As to claim 18, Galmiche et al. teaches heating at a temperature of 1060-1065 C in Example I (col. 6, lines 60-61).

As to claim 16, Galmiche et al. does not teach use of metal halide activators. However, it would have been obvious for one having ordinary skill in the art to have substituted or used in addition other similar, known halide activators with the preferred ammonium halide activator in the process of Galmiche et al. with the expectation of similar and equivalent results, in the absence of a showing of criticality.

As to claim 32, it is noted that the mixture of Galmiche is selectively applied and adhered to the orifice in which chromaluminization is desired, not to the remainder of the ramp in Example I. The heating step in Galmiche causes the diffusion coating to form only on the surface to which it was selectively applied.

(10) Response to Arguments

With respect to the 35 USC 102(b) rejection of claims 1, 3-5, 9, 11, 12, and 31, Appellants argue that Galmiche uses alcohol to dissolve his surface active agent, Galmiche's ammonium halide activator is only slightly soluble in alcohol, and nothing in Galmiche suggests that a sufficient amount of alcohol is present to dissolve the activator. Appellants further argue that even if sufficient alcohol were used to have some effect on the activator, the activator is still

only slightly soluble in alcohol and therefore would not result in Appellants' claimed step of using "an activator dissolved in a solvent" as the sole ingredient for cohering a donor material and fill. The Examiner notes that the claim broadly reads on any amount of activator dissolved in solvent, and that there is nothing in the claim requiring that the activator is *entirely* dissolved in solvent. It is the Examiner's position that at least some of the activator will dissolve in the solvent, and this amount will cohere donor material and filler, meeting the claim limitations.

Appellants further argue that the Examiner overlooks the fact that Galmiche's surface active agent is dissolved, and therefore any physical effect that Galmiche's dissolved surface active agent may have on Galmiche's mixture is purely speculative. This is not convincing to the Examiner. Even though the surface active agent is dissolved in solvent, one would not expect the solvent to change the properties of the surface active agent, particularly because the purpose of a surface active agents is to reduce surface tension *when dissolved in solution*.

Appellants also argue that it would seem highly improbable that Galmiche's dissolved surface active agent would not contribute at least slightly to the cohesiveness of Galmiche's mixture, since all other ingredients in Galmiche's mixture are dry powders. The Examiner disagrees. Surface active agents reduce surface tension between a liquid and a solid and allow easier spreading of a liquid; this property is what confers the thixotropic properties of the mixture. Therefore, the surface active agent, such as oleic acid (which is an oily liquid), responsible for conferring thixotropic properties in Galmiche's invention has a property *opposite* of acting as an adhesive or binder as argued by Appellants -- a property of reducing surface tension and causing spreading.

With respect to the 35 USC 102(b) rejection of claims 21, 23-25, 28, 30, and 33,

Appellants argue that Galmiche does not disclose or suggest a step that involves “dissolving an activator in a solvent to form an activator solution,” which is then mixed with a particulate filler and a particulate donor material to form an adhesive mixture. Appellants also argue that Galmiche does not disclose that a sufficient amount of alcohol is used to dissolve a sufficient amount of activator to form a solution. The Examiner disagrees for the reasons discussed above. Specifically that the claim broadly reads on *any* amount of activator dissolved in solvent, and that there is nothing in the claim requiring that the activator is *entirely* dissolved in solvent. It is the Examiner’s position that at least some of the activator will dissolve in the solvent, which forms a solution, and this amount will cohere the binder and donor material, meeting the claim limitation.

With respect to the 35 USC 102(b) rejection of claims 2 and 22, Appellants argue that they cannot find any support for the Examiner’s conclusion that Galmiche’s mixture “adheres” to any surfaces. The Examiner notes that Galmiche teaches that its cement “lines” internal cavities (Abstract) and once vibration stops and the mixture is left to stand, it “remain[s] in place” (col. 4, lines 1-4), and then after diffusion heat treatment a “coating” on the order of 50-60 microns is achieved (Example I, col. 6, lines 62-63). A coating would not be achieved if Galmiche’s mixture did not adhere to the surface of the substrate. Further, it is noted that Galmiche teaches that external surfaces of substrates may be treated as well as internal surfaces (col. 4, lines 64-66 and col. 6, lines 3-6); such treatment of external surfaces would require that the mixture

adheres to the external surfaces/outer walls since the cement is taught to remain in place after application/ vibration is stopped.

Appellants also argues that if Galmiche's surface active agent behaves as proposed by the Examiner, then it seems contradictory to conclude that Galmiche's mixture would adhere to anything. The Examiner disagrees. Galmiche states that the surface active agent acts to confer thixotropic properties such that the mixture is *provisionally flowable* under the effect of vibration, but then resumes its initial very viscous consistency after a lapse of time in resting condition (col. 2). Thus while Galmiche's mixture may be made temporarily flowable under vibration due to the presence of the surface active agent, the mixture is not so anti-adhesive that it cannot adhere to surfaces. As discussed above, Galmiche teaches that its mixture is applied to line internal cavities and "remain[s] in place" after being left to stand without vibration (Abstract and col. 4, lines 1-4).

With respect to the 35 USC 103 rejection of claims 7 and 10, Appellants argue that Galmiche fails to disclose or even suggest that a sufficient amount of alcohol is present to dissolve the activator, and even if sufficient alcohol were used to affect the activator, the activator is still only slightly soluble in alcohol and therefore would not result in Appellants' claimed step of using "an activator dissolved in a solvent" as the sole ingredient for cohering a donor material and filler. As discussed above, the Examiner notes that that the claim broadly reads on any amount of activator dissolved in solvent, and that there is nothing in the claim requiring that the activator is *entirely* dissolved in solvent. It is the Examiner's position that at

least some of the activator will dissolve in the solvent, and this amount will cohere donor material and filler, meeting the claim limitations.

Appellants also argue that it would seem highly improbable that Galmiche's dissolved surface active agent would not contribute at least slightly to the cohesiveness of Galmiche's mixture, since all other ingredients in Galmiche's mixture are dry powders. The Examiner disagrees. Surface active agents reduce surface tension between a liquid and a solid and allow easier spreading of a liquid; this property is what confers the thixotropic properties of the mixture. Therefore, the surface active agent, such as oleic acid (which is an oily liquid), responsible for conferring thixotropic properties in Galmiche's invention has a property *opposite* of acting as an adhesive or binder as argued by Appellant -- a property of reducing surface tension and causing spreading.

With respect to the 35 USC 103 rejection of claim 29, Appellants argue that Galmiche neither teaches nor suggests forming an "activator solution" which Appellants believe is far different than the "slightly" dissolved activator proposed by the Examiner. The Examiner disagrees and maintains that any amount of activator dissolved by solvent, which at least some activator would be as discussed above, forms an activator solution.

With respect to the 35 USC 103 rejection of claims 13-20 and 32, Appellants argue that whether Galmiche's mixture could adhere to a surface after being dried to a solid is purely speculative. The Examiner notes the arguments provided above with respect to claims 2 and 22.

Appellants also argue that Galmiche does not teach or suggest dissolving an activator with water, or whether water can even be used in Galmiche's process without some adverse results. While Galmiche does not specifically teach use of water, the Examiner maintains the position that it would have been obvious to have used water as the solvent in the process of Galmiche with the expectation of similar and successful results since water is inexpensive, readily available, and is chemically similar to the alcohols used in Galmiche's process and has a boiling point in the specified boiling point range. Additionally, Galmiche's list of surface active agents is merely exemplary and not limiting.

With respect to the 35 USC 103 rejection of claims 6 and 26, Appellants argues that Galmiche does not teach or suggest dissolving an activator with water, or that water is even compatible with Galmiche's process. The Examiner notes the arguments provided above with respect to claims 13-20 and 32.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

Art Unit: 1762

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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